

BC hydro

**A Prospectus for the
KELLY LAKE
SUBSTATION TO
CHEEKYE SUBSTATION
SECOND 500kV
TRANSMISSION LINE**

September 1989



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Prospectus Kelly Lake Substation to Cheekye Substation

A Second 500 kV Transmission Line
September 1989

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Introduction

Recent forecasts of electrical demand in the Lower Mainland and on Vancouver Island, combined with engineering studies of the electrical transmission system, have identified a potential requirement for new transmission in the mid-1990s to ensure the continued reliable supply of electricity to customers in those regions. This Prospectus outlines B.C. Hydro's studies for a second 500 kV¹ transmission line between Kelly Lake Substation near Clinton and Cheekye Substation near Squamish to meet that potential requirement and includes:

- a brief description of the project and a schedule for meeting an in-service date as early as the fall of 1995;
- a summary of the rationale for carrying out studies for a second Kelly Lake to Cheekye 500 kV line; and,
- an outline of the studies planned to determine a route for the line, including a comprehensive public consultation program.

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If in the Lower Mainland, call: 663-3616.

Project Description and Schedule

The project under study consists of a single circuit, 500 kV steel tower transmission line between Kelly Lake and Cheekye substations (Fig. 1) along a route yet to be determined. Presently there are two 230 kV transmission lines and one 500 kV transmission line between those substations. Both the 230 kV lines also connect into Bridge River Terminal. The two 230 kV lines and the 500 kV line follow completely different routes between Kelly Lake and Bridge River but from Bridge River to Cheekye the three lines are routed generally along a common corridor. Some of the possible routes being considered for the second 500 kV line are shown in Figure 2. The route alternative utilizing the existing transmission line corridor from Bridge River to Cheekye Substation would entail the removal of one of the existing 230 kV circuits and replacement of that circuit with the proposed 500 kV line where practicable.

While both self-supporting and guyed structures would be used in the construction of the second 500 kV line, the choice of tower type has not yet been determined. Schematic drawings of the types of structures being considered are shown in Figure 3. The structures shown in Figure 3A are similar to those of the existing 500 kV line between Kelly Lake and Cheekye. Those shown in Figure 3B would allow a reduced right-of-way width requirement and correspondingly less clearing as well as some potential electrical benefits. It is possible that both types of structures could be used with the choice along each section of the line depending on local factors.

A series capacitor bank² would be installed near the mid-point of the new line, possibly at the existing Creekside Capacitor Station north of Pemberton depending on the selected route.

A project schedule which would meet an in-service date as early as the fall of 1995 is outlined in Figures 4 and 5. Figure 4 covers activities during Phase 1, the planning and development phase, and Figure 5 covers activities during Phase 2, the design and construction phase. Although public

¹ Kilovolt (kV) or thousand volts, the operating voltage of the transmission lines.

² Series capacitors are inserted in transmission lines to increase the amount of electricity that can be transmitted.

consultation is an on-going activity that will continue throughout both phases, particular emphasis will be placed on public involvement during Phase 1, as identified in the schedule.

Following the Phase 1 public consultation program and completion of the environmental and engineering studies of route alternatives, an Application for an Energy Project Certificate would be submitted to the Minister of Energy Mines and Petroleum Resources under the terms of the Utilities Commission Act.

Project Study Rationale

As noted in B.C. Hydro's "Twenty-Year Resource Plan" dated April 1989, approximately 70% of the electricity B.C. Hydro produces is consumed in the Lower Mainland and on Vancouver Island. Most of this electricity flows through the Interior to Lower Mainland transmission system from generation sources located in the north on the Peace River and in the southeast on the Columbia River system (Fig. 1). Demand for electricity continues to grow in the Lower Mainland and on Vancouver Island and these two regions account for almost 75% of the expected growth in electrical requirements in the province over the next ten years.

All planned generating facilities are located at sites remote from the Lower Mainland and Vancouver Island regions. If present growth trends continue, new transmission will be required to reliably transmit electricity from new generating plants to the Lower Mainland and Vancouver Island load centres. A new 500 kV transmission line between Kelly Lake Substation near Clinton and Cheekye Substation near Squamish has been identified as the best alternative to reinforce the Interior to Lower Mainland transmission system. With growth in demand and lack of reinforcement, loss of a major line during heavy load periods would result in a widespread loss of load in the Lower Mainland and on Vancouver Island.

Depending on timing and routing, the estimated total cost of the Kelly Lake to Cheekye 500 kV transmission project, including inflation, corporate overhead and interest during construction, would be in the \$170-250 million range. The new line would maintain system reliability and greatly reduce system losses.³ With reduced losses, more of the electricity that is generated would be available for users resulting in net savings in the amount of electricity that must be generated to service customer demand. The total value of the savings in losses that would be realized by a second 500 kV transmission line between Kelly Lake and Cheekye could account for approximately 70% of the capital and operating costs associated with the new line.

Route Selection Process

In the late 1970s and early 1980s, B.C. Hydro investigated routes for additional 500 kV transmission between Kelly Lake and Cheekye substations. The new studies will use relevant information from the previous studies but will not be limited to those findings. The present route selection process will be concerned with optimizing land use and with minimizing the social, economic and environmental impacts of the new line. The rough terrain, potential for severe weather conditions, route length and the possibility of using portions of existing 230 kV right-of-way will also be considered in selecting a route. Some of the possible routes to be studied are shown in Figure 2 but no commitments have yet been made.

Public Consultation Program

In the late 1970s and early 1980s, B.C. Hydro held numerous public meetings to discuss this project. The present public consultation program will identify and respond to community concerns in a proactive and open manner. Meetings and open houses will be held in communities along the possible routes to allow individuals, groups and all levels of government to exchange information and concerns with B.C. Hydro staff.

³ Losses are incurred in electric systems because the flow of electric current heats the wires through which it flows.

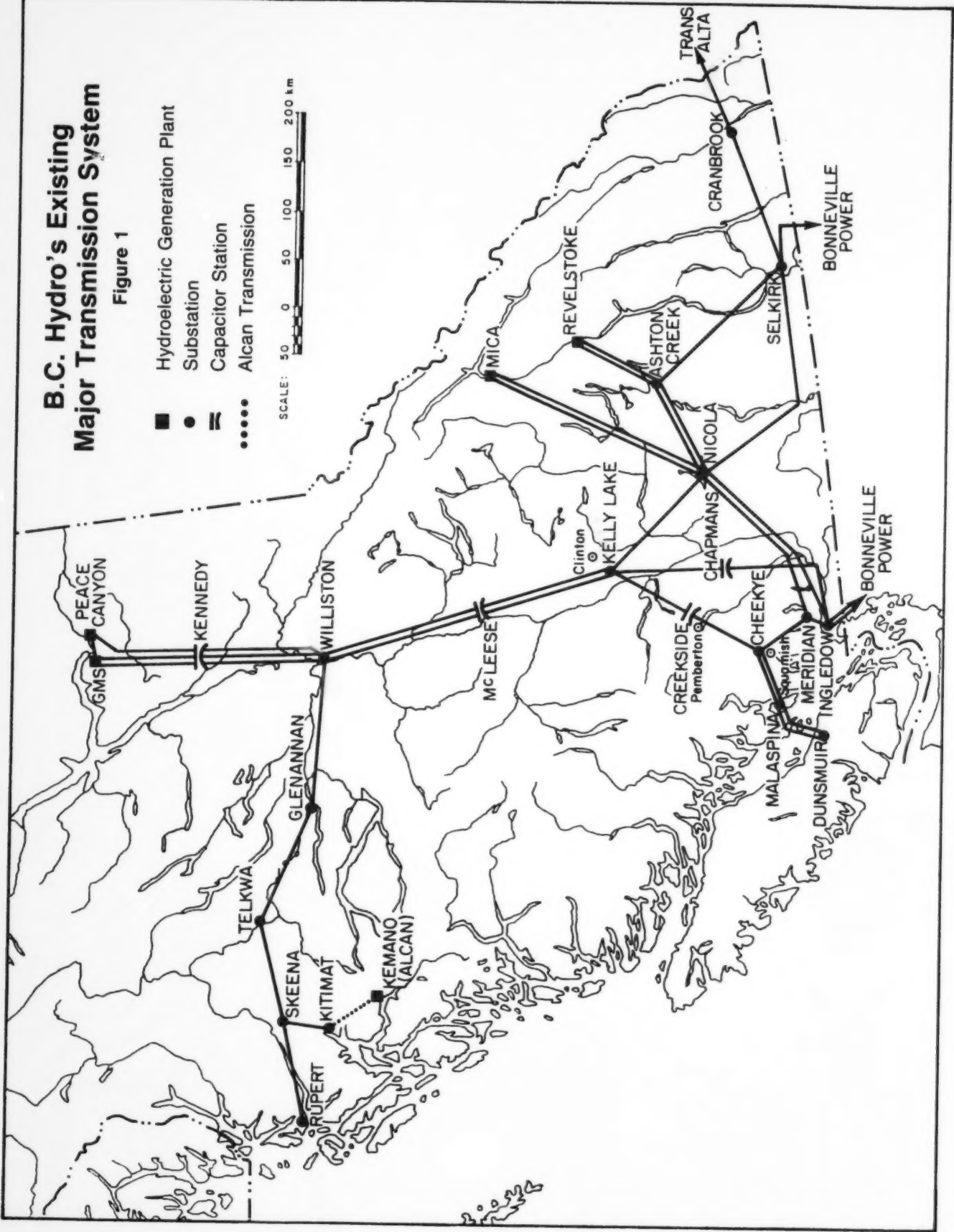
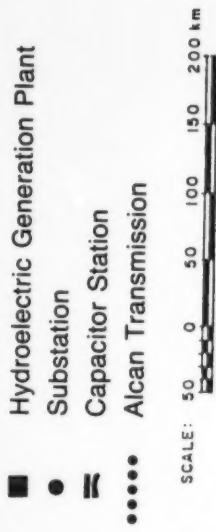
The consultation program has begun. Regional Districts and municipal councils are being briefed and a press release has been issued. This is an on-going program and B.C. Hydro will ensure that engineering and environmental study results and project information are available to interested groups and individuals.

Environmental and Engineering Studies

Environmental studies of possible routes will include assessments of potential ecological and social impacts of the proposed second 500 kV line and ways of avoiding or mitigating those impacts. The environmental study team will use information from all available sources including government resource agencies, special interest groups and individuals. The environmental studies will be coordinated closely with engineering studies which will be concerned with design, security, cost and technical feasibility of route alternatives.

B.C. Hydro's Existing Major Transmission System

Figure 1



ROUTE ASSESSMENT

Detailed Studies 
Overview Studies 



BChydro



KELLY LAKE-CHEEKYE
500 kV TRANSMISSION LINE
POSSIBLE ROUTES

Figure 2

July 1989

Kelly Lake — Cheekye 500 kV Transmission Project Structure Types

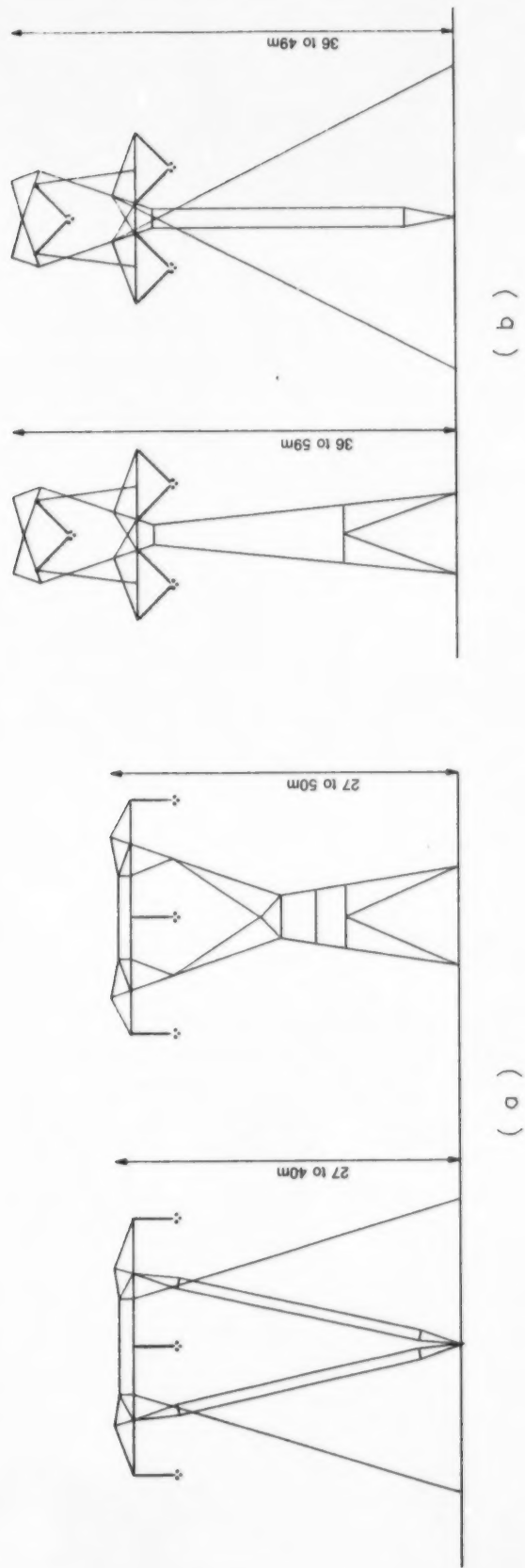


Figure 3

Kelly Lake — Cheekye 500 kV Transmission Project Proposed Project Schedule

Phase 1 Planning and Development

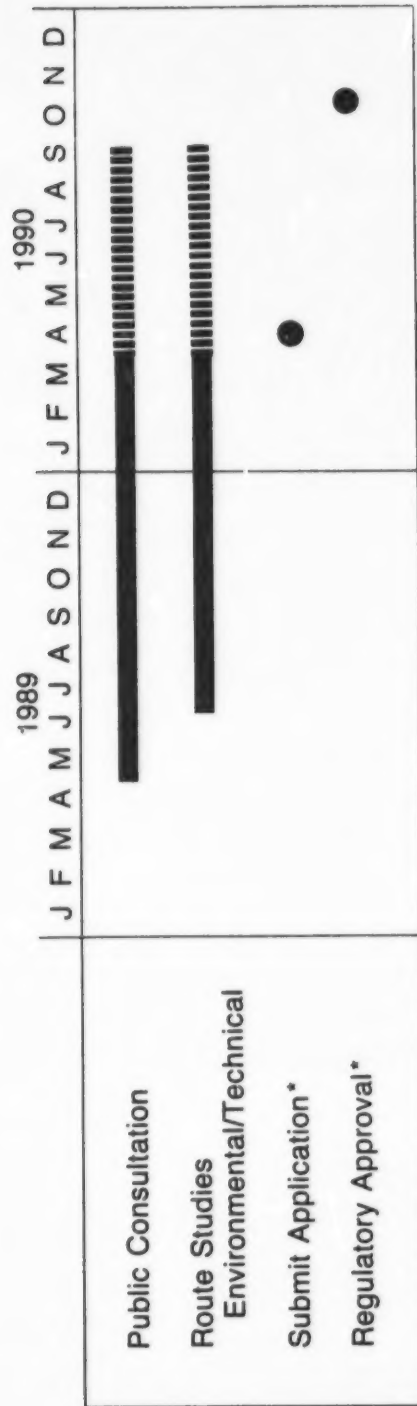
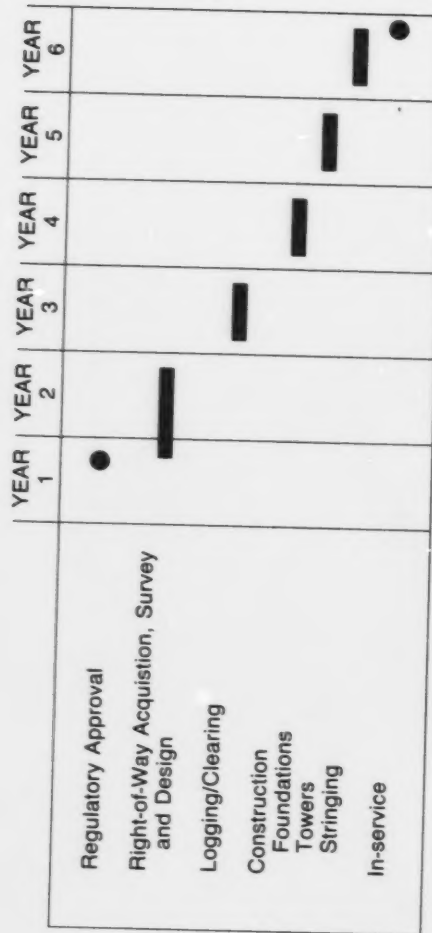


Figure 4

Kelly Lake — Cheekye 500 kV Transmission Project Proposed Project Schedule

Phase 2 Design and Construction



Notes:

- Begins with regulatory approval
- Entails right-of-way acquisition, survey, design, clearing and construction
- Requires approx. 5 to 5.5 years
- Based on Phase 1 schedule, the earliest in-service date would be late 1995.
- Actual in-service will be determined. It depends on a number of factors such as: actual load growth experienced, duration and results of public consultation program, etc.

Figure 5